EPA REGION IX

AQUIFER EXEMPTION GUIDANCE

March, 1993

AQUIFER EXEMPTION REQUEST GUI ANCE

CONTENTS

AQUIFER EXEMPTION REQUEST GUIDANCE

I. General

40 CFR §144.7(a) specifies that all aquifers or their portions which meet the definition of USDW shall be protected, except where exempted under 40 CFR §144.7(b). As a consequence of this requirement, persons desiring to operate specific kinds of injection wells may want to apply for the exemption of certain aquifers or their portions from protection as USDWs.

EPA will approve aquifer exemption requests only for specific purposes. All exemption approvals must include a description of the injection activities allowed and a statement that additional approvals are needed for any other injection activities, e.g., non-hazardous industrial waste disposal into an aquifer exempted for mineral production.

II. Definitions

A. Aquifer

An aquifer is defined (40 CFR §144.3) as a geological formation, group of formations, or part of a formation which is capable of yielding a significant amount of water to a well or spring.

B. Underground Source of Drinking Water (USDW)

A USDW is defined (40 CFR §144.3) as an aquifer or its portion which

1. a. supplies any public water system; or

   b. contains sufficient quantity of ground water to supply a public water system; and

      (1) currently supplies drinking water for human consumption; or

      (2) contains fewer than 10,000 mg/l total dissolved solids (TDS); and

2. is not an exempted aquifer.

C. Public Water System

A public water system is defined (40 CFR §142.2(k)) as a system for the provision to the public of piped water for human consumption, if such system has at least fifteen service connections or regularly serves an average of at least twenty individuals daily at least sixty days out of the year.

III. Regulations

A. Identification of Exempted Aquifers, 40 CFR §144.7

1. The Director may identify and shall protect, except where exempted, as an underground source of drinking water, all aquifers or parts of aquifers which meet the definition of "underground source of drinking water" in 40 CFR §144.3. Even if an aquifer has not been specifically identified by the Director, it is an underground source of drinking water if it meets the definition in §144.3.

2. a. The Director may identify and describe in geographic and/or geometric terms which are clear and definite, all aquifers or parts thereof which the Director proposes to designate as exempted aquifers using the criteria in 40 CFR §146.04.

b. No designation of an exempted aquifer submitted as part of a UIC Program shall be final until approved by the Administrator as part of a UIC Program.

c. Subsequent to program approval, the Director may, after notice and opportunity for a public hearing, identify additional exempted aquifers. For approved State programs, exempted aquifers identified:

i. under 40 CFR §146.04(b) shall be treated as a program revision under 40 CFR §145.32;

ii. under 40 CFR §146.04(c) shall become final if the State Director submits the exemption in writing to the Administrator and the Administrator has not disapproved the designation within 45 days.

Any disapproval by the Administrator shall state the reasons and shall constitute final Agency action for purposes of judicial review.

3. a. For Class III wells, the Director shall require an applicant for a permit which necessitates an aquifer exemption under 40 CFR §146.04(b) to furnish the data necessary to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing. Information contained in the mining plan for the proposed project, such as a map and general description of the mining zone, general information on the mineralogy and geochemistry of the mining zone, analysis of the amenability of the mining zone to the proposed mining method, and a timetable of planned development shall be considered by the Director in addition to the information required by §144.13(g).

b. For Class II wells, a demonstration of commercial producibility shall be made as follows:

i. For a Class II well to be used for enhanced oil recovery processes in a field or project containing aquifers from which hydrocarbons were previously produced, commercial producibility shall be presumed by the Director upon a demonstration by the applicant of historical production having occurred in the project area or field.

ii. For Class II wells not located in a field or project containing aquifers from which hydrocarbons were previously produced, information such as logs, core data, formation description, formation depth, formation thickness, and formation parameters such as permeability and porosity shall be considered by the Director, to the extent such information is available.

B. Criteria for Exempted Aquifers, 40 CFR §146.04

An aquifer or portion thereof which meets the criteria of an "underground source of drinking water" in 40 CFR §146.3 may be determined under 40 CFR §144.7 to be an "exempted aquifer" if it meets the following criteria:

1. It does not currently serve as a source of drinking water.

2. It cannot now and will not in the future serve as a source of drinking water because:

a. it is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that, considering their quantity and location, are expected to be commercial producible;

b. it is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

c. it is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or

d. it is located over a Class III well mining area subject to subsidence or catastrophic collapse.

OR

3. The total dissolved solids (TDS) content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.

IV. Procedure for Submission, Review, and Approval of Aquifer Exemption Requests

A. Major and Minor Aquifer Exemptions

1. Major Exemptions

Major aquifer exemptions are for aquifers which:

a. are approved under 40 CFR §146.04(b), ~~or~~ AND

b. contain waters with TDS concentrations less than 3,000 mg/l, ~~or~~ AND

c. are not part of a permitting action.

Notice of major aquifer exemptions must be published in the Federal Register.

Major aquifer exemptions are substantial program revisions to primacy state UIC programs.

2. Minor Exemptions

Minor aquifer exemptions are exemptions which are not major exemptions.

Notice of minor aquifer exemptions does not need to be published in the Federal Register.

Minor aquifer exemptions are not substantial program revisions to primacy state UIC programs.

B. Delegation of Authority

The final authority to approve or disapprove aquifer exemptions generally rests with the Regional Administrator except in very special cases where it rests with the Administrator. Such special cases include the exemption of extremely large aquifers (like the 21 square mile Osage Aquifer) that may affect several EPA Regions.

C. Public Notification and Hearing Requirements

EPA regulations require that the general public be informed of all exemption requests and be given an opportunity to comment. EPA will conduct the same public notification and participation procedures (40 CFR § 124) for these exemptions as would apply to a permitting action (49 Federal Register 20143, 11 May 1984).

In the case of a Class I, II, or III permit application which requires an aquifer exemption, the notification and opportunity for a public hearing can be implemented along with similar requirements for the permit.

For aquifer exemption requests submitted with a state application for primacy, public hearing requirements are specified as part of the procedure for program submission in 40 CFR §145.31. Aquifer exemption requests which constitute a substantial program revision (e.g., 40 CFR §146.04(b) submitted by a primacy state after the effective date of the state program are subject to the requirements of 40 CFR §§ 124 and 145.32, and EPA will provide notice and opportunity for a public hearing.

D. Timetable for Processing and Reviewing Aquifer Exemption Requests

The regulations do not specify any deadlines for approval or denial of aquifer exemption requests in direct implementation states. The concurrence of the EPA Region IX Ground Water Steering Committee is required for all aquifer exemptions in direct implementation states. In this event the same time frame should be adhered to as in a Class I permitting action.

Aquifer exemption requests submitted with a state application for primacy should be in accordance with the protocol set as part of the program submission.

For operators in primacy states, the State Director will review the exemption request. The approval or disapproval of the exemption will be made by the State Director and concurred on by the EPA Regional Office. After the application is deemed complete by the State Director, the request must be approved or disapproved within 60 days of arrival in the Regional Office. Extensions will be granted as negotiated between the Regional Office and the State Director. The deadline for approval or denial of an aquifer exemption request for a 3,000 to 10,000 mg/l TDS aquifer, 40 CFR §146.04(c), is 45 days. 40 CFR §144.7(b)(3)(ii) - In this case, the check for completeness should occur in three days. The countdown for the 45 day deadline begins when the Regional Office receives the submission.

E. Approval or Disapproval of Aquifer Exemption Requests

A letter from the (Regional) Administrator stating the approval or disapproval of an aquifer exemption request should be sent to the applicant. For major aquifer exemptions, a letter of approval or disapproval is sent to the applicant and notice of approval or disapproval must be published in the Federal Register within a reasonable time. If the request is disapproved, the applicant is entitled to a written explanation. The effective date of the notice will be the date the letter is sent to the applicant. Minor aquifer exemptions require no Federal Register publication.

For exemption requests submitted by a primacy state, the letter of approval or disapproval should be sent by the end of the appropriate time period discussed in item D above. In the case of an aquifer exemption request of a 3,000 to 10,000 mg/l TDS aquifer submitted by a primacy state, if the request has not been approved within the 45 day time period, the exemption is deemed approved.
40 CFR §144.7(b)(3)(ii).

F. General Comments

The following general comments pertaining to the identification of exempted aquifers under 40 CFR §144.7 and the exemption criteria in 40 CFR §146.04 should be considered when reviewing an application for an aquifer exemption.

1. Generally, exemptions are seen as a precondition for a UIC permit or they run concurrently with it. If the deadline for a permit decision falls earlier than the deadline for the exemption, the latter deadline should apply for both.

2. The RCRA Land Disposal Restrictions (40 CFR §268) prohibit the injection of hazardous waste unless the operator has an approved no migration exemption. The no migration petition approval process receives extremely high levels of EPA review and public scrutiny. An aquifer exemption request for the injection of hazardous waste will be received in conjunction with a Class I hazardous waste injection well no migration petition.

3. Permits, or their equivalent (authorization by rule) are required for all injection wells regardless of the quality or status of the fluid in the injection zone. 40 CFR §144.11.

4. If a portion of an aquifer is to be exempted, adequate safeguards such as monitoring wells, buffer zones, etc., should be provided to protect the rest of the aquifer.

5. EPA has the discretion to approve or deny the exemption of any aquifer that meets the exemption criteria of 40 CFR §146.04, and to define the aquifer by vertical limits, lateral limits, or other distinguishing factors. EPA will approve aquifer exemption requests only for specific purposes and specific time periods. The fact that an aquifer is exempted for one activity does not mean that it is appropriate to allow potentially more dangerous injections of hazardous or other industrial waste into the aquifer. If an aquifer is appropriate for other types of injections, such may be determined and affirmed in a separate aquifer exemption proceeding designed to look at the specific type of injection for which the additional exemption is being sought. 49 Federal Register 20143, 11 May 1984.

6. Projections of future demands, costs, and uses of drinking water, in addition to future developments and improvements in water treatment technology are difficult, if not impossible, to make. However, although such factors are unknown, they should be respectfully taken into consideration when reviewing an exemption request. From this viewpoint, the body of reasoning for an aquifer exemption should provide an overwhelmingly convincing argument in its favor.

G. Specific Comments

The following are some specific comments pertaining to the aquifer exemption criteria in 40 CFR §146.04 to consider when reviewing an application for an aquifer exemption.

1. 40 CFR §146.04(a)

The present use of a USDW as a drinking water supply for humans or any use which may result in endangerment of human health precludes the exemption of the aquifer.

2. 40 CFR §146.04(b)

The fact that a USDW is not currently being used as a source of drinking water does not qualify it for an aquifer exemption unless it meets one of the specific criteria listed.

3. 40 CFR §146.04(b)(1)

The fact that a USDW can be demonstrated to contain producible amounts of minerals, hydrocarbons, or geothermal energy qualifies it for a possible aquifer exemption.

4. 40 CFR §146.04(b)(2)

What constitutes an economically or technologically impractical depth and location of a USDW is subjective in an aquifer exemption request determination. In Region IX water has been drilled for successfully at depths exceeding 3000 feet. Using this criterion for granting an aquifer exemption should only be used in extreme cases.

5. 40 CFR §146.04(b)(3)

This condition was placed in the regulations for cases where there may have been contamination of a USDW by injection wells prior to the promulgation of the UIC regulations. The Regional policy is not to use this criterion for wells that have been operating in violation of the UIC regulations. These injection wells are to be subjected to enforcement, not aquifer exemptions.

6. 40 CFR §146.04(b)(4)

Class III projects typically require aquifer exemptions due to the nature of the mining project. Since there

are few Class III wells in Region IX, this type of aquifer exemption request may be less common than those for other injection wells.

7. 40 CFR §146.04(c)

This regulation implies that no USDW with TDS less than 3000 mg/l is eligible for an aquifer exemption unless it meets one of the criteria in 40 CFR §146.04(b).

V. Level of Justification

The most significant tasks in approving an aquifer exemption request are defining the aquifer, delineating its boundaries (including confining zones), and justifying the need for the exemption. A guide to the evidence is outlined in the following checklist.

This checklist is provided solely for use as an aid in preparing and reviewing aquifer exemption requests. Refer to 40 CFR 144.7 for general provisions; to 40 CFR 146.04, for criteria and standards applicable to aquifer exemptions.

Data and other evidence which are used to support the aquifer exemption request must be included with the application.

Economic analyses shall be done in a precise, detailed, and representative manner.

Maps required for the aquifer exemption application are in addition to any maps required in other applications (e.g., permit applications). Other information required for the aquifer exemption request that is available as part of an accompanying permit application may be incorporated by reference.

A. General Inventory Information

1. Facility name, address
2. Owner name, address
3. Operator/legal contract name, address
4. Project type (e.g., generation, transportation, treatment facility)
5. Operating status of injection well(s)
6. Listing of all permits or construction approvals

B. Purpose of Proposed Aquifer Exemption

1. Explain the purpose, need for, and intentions of the exemption, other than those listed in item B4 below.

2. Provide a narrative description of the proposed aquifer exemption, including the proposed exempted aquifer, confining zone, boundaries, injection practices, etc. Discuss the need to inject into this zone as opposed to injecting into other zones which are not USDWs.

3. A declaration that the aquifer cannot now and will not in the future. The burden of proof is left to the applicant.

4. Reason for requesting the aquifer exemption. The reason must include either (a) and (b), or (a) and (c) below:

a. The aquifer does not currently serve as a source of drinking water.

b. The aquifer cannot now and will not in the future serve as a source of drinking water because:

i. The aquifer is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that, considering their quantity and location, are expected to be commercially producible.

ii. The aquifer is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical (a detailed economic analysis is required).

iii. The aquifer is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption (a detailed economic analysis is required).

iv. The aquifer is located over a Class III well mining area subject to subsidence or catastrophic collapse.

c. The total dissolved solids content of the groundwater is more than 3000, and less than 10,000, mg/l and it is not reasonably expected to supply a public water system.

5. An estimate of the time duration of the proposed aquifer exemption.

6. An analysis of alternatives to the proposed underground injection project for disposal of the wastes.

7. An analysis of the environmental impacts of the proposed aquifer exemption, including any adverse environmental effects which cannot be avoided; any irreversible or irretrievable commitments of resources which would be involved should the exemption be approved; the relationship between short-term uses of the aquifer for waste disposal purpose; and the long-term benefits of maintaining the present aquifer conditions.

NOTES:

Item B1: EPA will approve aquifer exemptions only for specific purposes. Any exemption request must describe the injection activities to be allowed. Additional approvals shall be required for other injection activities (e.g., non-hazardous industrial wastewater disposal into an aquifer exempted for mineral production).

Item B4a: At a minimum, a survey should be conducted to identify all water supply wells in the area of the proposed exempted aquifer and the buffer zone. If no water supply wells would be affected by the exemption, the request should state that a survey was conducted and no water supply wells were located which will be affected by the proposed exemption. If the proposed aquifer exemption pertains to only a portion of an aquifer, a demonstration must be made that the waste will remain within the exempted portion of the aquifer.

Item B4bi: The applicant for an aquifer exemption is required to furnish the data necessary to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing. If the proposed aquifer exemption is to allow a Class II enhanced oil recovery well or an existing Class III injection well operation to continue, the fact that the aquifer has a history of hydrocarbon or mineral production will be sufficient proof that this standard has been met. Applicants for aquifer exemption to allow new mining must demonstrate that the aquifer is expected to contain commercially producible quantities of minerals. Information

ained in the mining plan for the proposed project, such a map and general description of the mining zone, general information on the mineralogy and geochemistry of the mining zone, analysis of the amenability of the mining zone to the proposed mining method, and a timetable of planned development of the mining zone, shall be required. An analysis of a sample acquired using a formation tester or coring tool shall be required to show that the aquifer contains producible levels of minerals. This should be coupled with reserve calculations and rate of return projections for the aquifer in question. Exemptions relating to any new Class II wells which will be injecting into a producing or previously produced horizon shall include the following types of information: the production history of the well if it is a former production well which is being converted; a description of any drill stem tests run on the horizon in question; the production history of other wells in the vicinity which produce from the horizon in question; and a description of the project if it is an enhanced recovery operation, including the number of wells and their location.

Structural contour maps and cross sections for the zone of injection, along with any available radioactive tracer surveys, would infer if the injection is going to be into a geothermal producing aquifer where steam is produced underground and at the surface.

Item B4bii: An economic analysis coupled with technological considerations is required from the applicant to determine if the aquifer's water could be economically pumped to the surface and used as a source of water supply. Specifically, the applicant shall calculate the optimum annual yield of the aquifer and the net present value associated with the development and operation of the aquifer as a water supply source. The optimum annual yield shall be determined by identifying the location of ground water wells which would maximize the water output without dangerous depletion of the storage reserve of the aquifer. The net present value shall be determined by identifying all capital and operating costs associated with the water project and discounting these costs over the life of the project. See Section H below for additional details on economic evaluation of water supply development costs.

Item B4biii: An economic analysis coupled with technological considerations is required to determine if the aquifer's water could be economically pumped to the surface and made fit for human consumption. See Section I below for additional details on economic evaluation of water supply treatment technology and costs.

Item B4biv: The aquifer exemption request should discuss the proposed mining method and why the method necessarily causes subsidence or collapse. The possibility that non-exempted USDWs would be contaminated due to the collapse should also be addressed in the application. Structural contour maps and cross sections, pore pressure information from drilling, and mud logs for both the aquifer and the zone being mined are required.

Item B4c: The aquifer exemption request must include information about the quality and availability of water from the proposed exempted aquifer. Also, the exemption request must analyze the potential for public water supply use of the aquifer. Details required for this analysis are outlined in Section M below.

C. Maps of Area of Proposed Aquifer Exemption

1. Base map of area (USGS topographic map with a scale of 1:24,000 or larger; maps should extend a minimum of one mile beyond the proposed aquifer exemption boundaries; more than one map may be needed). The map should:

   a. precisely depict, in square miles or acres, the area overlying the proposed exempted aquifer, or portion of the aquifer, both on the map and in some universal unit (e.g., latitude/longitude, distances, bearing);

   b. delineate in square miles or acres the boundaries of the aquifer, both on the map and in some universal unit, e.g. latitude/longitude, distances, bearing (note: this area will be larger than that in item a above if only a portion of the aquifer is being requested for exemption);

   c. delineate the boundaries of any existing or proposed aquifer exemptions both on the map and in some universal unit (e.g., latitude/longitude, distances, bearing);

   d. show a "buffer zone" around the area of the proposed exempted aquifer (this buffer zone should be an area of limited future ground water development extending a minimum of 1/4 mile from the boundary of the proposed exempted aquifer);

   e. show the location of all monitoring wells completed, or to be completed, in the buffer

zone to assure that injected fluids do not migrate from the exempted aquifer; and

f. delineate the boundaries of all property owners and holders of water rights within the area of the proposed exempted aquifer and buffer zone for the purpose of public notification (include a list of names and mailing addresses).

2. Topographic map showing all wells in the area of the proposed exempted aquifer and buffer zone (same scale as above) with accompanying explanation or table to include:

   a. well identification (name and number)
   b. well type (e.g., production, injection, irrigation, water supply, enhanced recovery, monitoring, abandoned, dry holes)
   c. well depth
   d. status (e.g., active, inactive, plugged, abandoned)
   e. date drilled and dates of significant workovers
   f. construction information (including cement, casing, tubing, completion type, and plugging records)
   g. perforated interval
   h. location (township, range, section)
   i. corrective/remedial action for improperly plugged wells
   j. history of injection operations (existing wells only)

3. Map showing the location of the closest domestic and public water supply wells with tables of relevant information such as number of users, depth of water wells with aquifer names, and water quality information.

D. Maps and Cross Sections of USDWs

1. Geologic cross sections (two perpendicular sections) showing:

   a. geologic formations
   b. structural features
   c. TDS levels for each formation
   d. underground sources of drinking water
   e. proposed exempted aquifer
   f. confining zone

2. Isopach maps (2)

   a. proposed exempted aquifer
   b. injection zone

E. Maps and Cross Sections of Geologic Structure of Area

1. Geologic maps

   a. local area
   b. regional setting

2. Structural contour map (mapped to top of proposed exempted aquifer)

3. Stratigraphic column (local area)

   a. lithology of each formation
   b. mineralogy of proposed exempted aquifer and confining zones
   c. thickness of each formation
   d. hydraulic conductivity/permeability of proposed exempted aquifer and confining zones
   e. salinity profile (TDS)
   f. 10,000 mg/l TDS baseline (freshwater baseline)
   g. geologic time scale

4. Stratigraphic column (regional setting)

5. Regional geology (narrative description)

   a. regional structural geology
   b. regional stratigraphy
   c. seismic activity
   d. tectonic history

F. Operating Data and Injection Procedures

1. Injection rate (ave., max.)

2. Injection pressure (ave., max.)

3. Annular fluid (type, volume, additives, pressure, density/specific gravity)

4. Proposed injection procedures

5. Injection fluid characteristics

   a. narrative description of individual waste streams
   b. mix ratio (ave., max., daily) of waste streams (if applicable)

c. RCRA waste characterization (for hazardous wastes, refer to 40 CFR 261 subparts C and D)
d. cumulative analysis of commingled injectate (if applicable)
e. detailed description of sampling and analytical methods
f. analysis of chemical, physical, radiological and biological characteristics, including temperature, pH, density, and corrosiveness
g. compatibility of waste stream(s) with receiving formation, well components, and other waste streams

6. Source of water (e.g., produced, facility supply well, municipal supply)

G. Formation Testing Program

1. Analysis of representative formation water sample (analysis of formation fluid to be conducted by an independent laboratory; analysis must address EPA Drinking Water Standards, i.e., MCLs and TDS at a minimum)

2. Description of sampling and analytical procedures

3. Direction and rate of regional ground water flow

4. Direction and rate of injected fluid migration

5. Salinity (TDS) profiles (include all calculation procedures and logs)

6. Results of, or proposed, injectivity testing

7. Hydrogeology of confining zone

a. thickness
b. age
c. lithology
d. mineralogy (if available)
e. structure (presence of faults, fractures, or cavities)
f. description of vertical and lateral continuity (e.g., depositional environment, facies changes, unconformities, and vertical and lateral extent of clay layers)
g. hydrologic parameters
i. hydraulic conductivity or permeability
ii. porosity
iii. oil/water saturation
iv. compressibility
v. formation fracture pressure, from

testing or calculations

h. potentiometric surface map

8. Hydrogeology of proposed exempted aquifer
   a. thickness
   b. age
   c. lithology
   d. mineralogy (if available)
   e. structure (presence of faults, fractures, or cavities)
   f. description of vertical and lateral continuity (e.g., depositional environment, facies changes, unconformities, presence of clay layers/lenses)
   g. hydrologic parameters
      i. hydraulic conductivity or permeability
      ii. porosity
      iii. reservoir pressure
      iv. storage coefficient
      v. oil/water saturation
      vi. compressibility
      vii. formation fracture pressure, from testing or calculations
   h. potentiometric surface map

H. Technological and Economic Analysis of Aquifer Development as Water Supply

Technological and economic evaluations shall consider the availability of alternative supplies of water, the adequacy of alternative sources to meet present and future water needs, and a demonstration that there are major costs for treatment and/or development associated with the use of the aquifer as a source of water supply. The evaluation shall consider the above factors and the following:

1. Distance from the proposed exempted aquifer to public water supplies.

2. Current sources of water supply for potential users of the proposed exempted aquifer.

3. Availability and quality of alternative water supply sources.

4. Analysis of future water supply needs within the general area.

5. Depth of the proposed exempted aquifer.

6. Quality of the water in the proposed exempted aquifer.

7. The costs to develop the proposed exempted aquifer as a water supply source, including any treatment costs and costs to develop alternative water supplies. This should also include costs of well construction, transportation, water treatment, etc., for each source.

I. Technological and Economic Analysis of Aquifer Water Treatment

Technological and economic evaluations shall consider the source, type, and severity of contamination in the proposed exempted aquifer, the availability of alternative supplies of water, the adequacy of alternative sources to meet present and future water needs, and a demonstration that there are major costs for treatment and/or development associated with the use of the aquifer as a source of water supply. The evaluation shall consider the above factors and the following:

1. Concentration and types of contaminants in the aquifer.

2. Source of contamination.

3. Whether the contamination source has been abated.

4. Extent of the contaminated area.

5. Probability that the contaminant plume will pass the proposed exempted area.

6. Availability of treatment technology to remove contaminants from the water.

7. Chemical content of proposed injection fluids.

8. Current water supply in the area.

9. Alternative water supplies.

10. Costs to develop current and probable future water supply from proposed exempted aquifer. This should include well construction costs, transportation costs, water treatment costs, etc.

11. Projections on future use of the proposed exempted aquifer.